

#### ABSTRACT OF THE DISCLOSURE

In detecting a deterioration of an air-fuel ratio sensor,  
a sensor output change speed integrated value is calculated when  
an element temperature of a solid electrolyte is stabilized at  
5 a low temperature. Successively, a sensor output change speed  
integrated value is calculated when the solid electrolyte element  
is stabilized at a high temperature. Finally, a deviation between  
the change speed integrated values is calculated. By comparing  
the deviation amount with a predetermined determinant, presence  
10 or absence of the deterioration is determined.